

Parasitic Helminths from Paraguay VII: Systematic Position of *Oxyascaris* Travassos, 1920 (Nematoda: Cosmocercoida)

by

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With 2 figures

ABSTRACT

Oxyascaris oxyascaris Travassos, 1920, from *Bufo paracnemis*, *Leptodactylus chaquensis* Ceï, *L. elenae* Heyer, *L. fuscus* (Schneider) (new host records) and *L. ocellatus* (L.), and *Oxyascaris caudacutus* (Freitas, 1958) n. comb. (= *Pteroxyascaris caudacutus* Freitas) from *Hyla fuscovaria* Lutz and *H. x-signata nasica* Cope of Paraguay are redescribed. New information on the presence of lateral alae, cephalic, oesophageal, and female reproductive morphology permit the following taxonomic conclusions: *Pteroxyascaris* Freitas, 1958, falls as a synonym of *Oxyascaris* Travassos, 1920; the Subfamily Oxyascaridinae Freitas, 1958, is synonymized with the Subfamily Cosmocercinae Railliet, 1916 (Cosmocercidae) and *Oxyascaris* is transferred to Cosmocercinae with an emended diagnosis.

INTRODUCTION

Two species of the Subfamily Oxyascaridinae Freitas, 1958 (Cosmocercoida) are redescribed from Paraguayan frogs. They are representatives of the two nominal genera classified in the subfamily: *Oxyascaris* Travassos, 1920 and *Pteroxyascaris* Freitas, 1958.

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The validity of the genus *Pteroxyascaris* and the systematic position of the Oxyascaridinae are reevaluated.

The material was collected during the Museum of Geneva expedition of 1979 (participants: F. Baud, V. Mahnert, J.-L. Perret and C. Vaucher, Geneva; C. Dlouhy, Asuncion).

I. DESCRIPTION OF SPECIES

Oxyascaris oxyascaris Travassos, 1920

Synonym: *Oxyascaris necopinus* Freitas, 1958 (see FABIO 1980).

Material examined: from *Leptodactylus chaquensis*, MHNG 979.616 (2 ♂, 8 ♀), 979.617 (3 ♂, 4 ♀, approx. 30 larvae), 979.618 (1 ♀), 979.619 (3 ♀), 979.620 (4 ♀), 979.621 (2 ♀), 979.622 (4 ♀, 2 larvae), 979.623 (1 ♂, 2 ♀); from *L. elenae*, 979.624 (1 ♀); from *L. fuscus*, 979.625 (3 ♀), 979.626 (1 ♀); from *L. ocellatus*, 979.627 (1 ♂); from *L. bufonius*, 979.628 (1 ♂); from *Bufo paracnemis*, 979.629 (1 ♀).

New Host Records: *Leptodactylus chaquensis*, *L. elenae*, *L. fuscus*, *L. bufonius*, *Bufo paracnemis*.

Localities and dates: Bella Vista, Amambay prov., 12-13.X.79 (979.616-621, 979.625, 979.629); estancia San Luis, Concepcion prov., 15.X.79 (979.622); 20 km South estancia Estrellas, Concepcion prov., 16 and 18.X.79 (979.628, 979.624); 12 km South Bella Vista, Amambay prov., 24.X.79 (979.623); estancia La Cordillera, Ypé Jhu, Canendiyu prov., 28.X.79 (979.627); Salto del Guaira, Canendiyu prov., 31.X.79 (979.626).

Description (Fig. 1): Oral opening triangular, three small lips present. Cephalic extremity with four large outer papillae, one small pair of lateral papillae beside amphids, and six minute inner papillae. Anterior extremity of oesophagus in form of three large projections covered with thick ring of cuticle and bearing on inner edge three small onchia. Lateral alae present in male, absent in female. Cephalic vesicle present, extending over anterior end to level just anterior to nerve ring, inconspicuous in small males. Oesophagus divided into short anterior pharyngeal portion of corpus, long and relatively wide posterior portion of corpus, slender isthmus, and posterior bulb which is relatively slender (not exceeding maximum width of corpus). Oesophageal bulb containing three small sclerotized valves. Somatic papillae present, in two subventral and two subdorsal rows; less numerous in females than males.

Male (7 specimens): Total length 2,69-9,84 mm. Length of oesophagus 372-781 µm. Nerve ring 176-375 µm and excretory pore 264-674 µm from anterior extremity. Lateral alae maximum width 7 µm, extending from cephalic vesicle to near anus, tapering gradually from mid-portion to anterior and posterior. Tail 150-345 µm long, conical, with short spike-like distal point. Caudal papillae slightly larger in size than somatic papillae. Tail with six pairs of small caudal papillae: three pairs subventral, one pair lateral, two pairs subdorsal. Adanal region with three pairs of small caudal papillae and one large unpaired papilla on anterior lip of cloaca. Preanal region with 2-5 pairs of small subventral caudal papillae. Subventral preanal region with 2-10 pairs of conspicuous muscles. Spicules 118-177 µm long, sharply pointed distally. Gubernaculum 71-82 µm long, weakly sclerotized.

Female (34 specimens): Total length 8,60-26,72 mm. Length of oesophagus 587-1259 µm. Nerve ring 263-488 µm, excretory pore 394-883 µm and vulva 4,00-12,01 mm

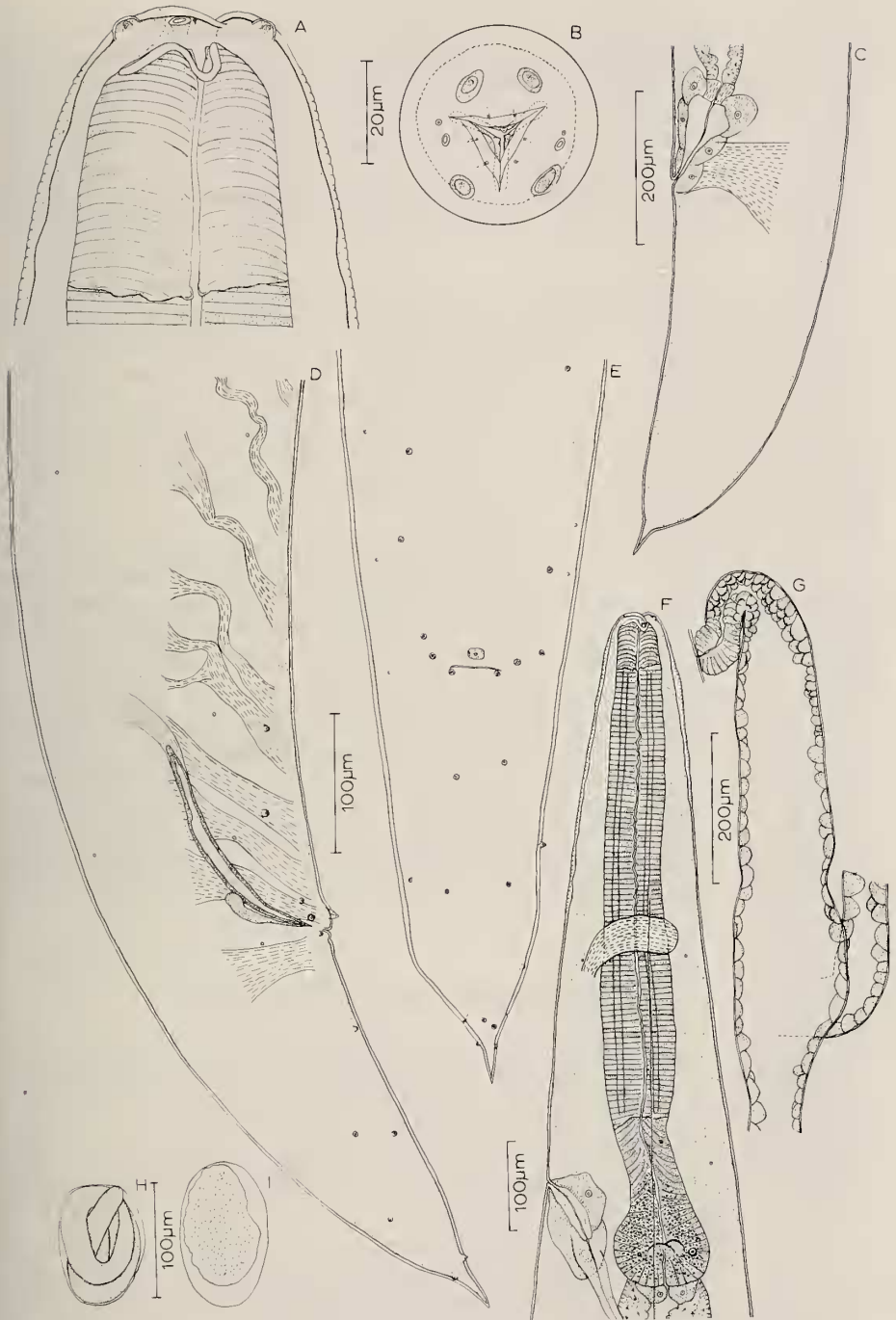


FIG. 1.

Oxyascaris oxyascaris Travassos, 1920. A, B, cephalic extremity, lateral and apical view. C, tail of female, lateral view. D, E, caudal end of male, lateral and ventral view. F, anterior end of male, lateral view. G, vagina, lateral view. H, I, eggs from uteri.

(slightly anterior to midbody) from anterior extremity. Tail 491-1480 μm long, robust, tapering abruptly to distal spike. Vagina muscular and anteriorly directed in proximal fifth, thin-walled and posteriorly directed in distal four-fifths, giving rise to one anteriorly and one posteriorly directed uterus. Anterior uterus extending slightly anterior to vulva, posterior uterus entirely posterior to vulva. Ovary of anterior uterus located just posterior to oesophagus, ovary of posterior uterus located at level of vulva. Uteri in mature females containing many eggs. Eggs 115-134 μm long and 77-80 μm wide (based on five specimens), thin-walled, specimens near vagina containing fully developed larvae, free larvae not observed *in utero*.

D i s c u s s i o n : *Oxyascaris oxyascaris* Travassos, 1920 was originally described from the snake *Dryadophis bifossatus* (Colubridae) (= *Drymobius bifossatus*) in the state of Rio de Janeiro, Brazil. The species has subsequently been reported in the colubrid snakes *Leimadophis poecilogyrus* and *Herpetodryas carinatus* of Rio de Janeiro and in the anurans *Leptodactylus sibilatrix*, *L. ocellatus*, *Pleurodema diplolistris* of the states of Mato Grosso, Sao Paulo and Bahia (FREITAS 1958), and in *Leptodactylus mystaceus*, *L. ocellatus*, *Physalaemus signiferus*, *P. soaresi* of Rio de Janeiro (VICENTE & SANTOS 1976; FABIO 1980, 1982). The present report from anurans of Paraguay represents a considerable extension in the geographical range of this species.

Oxyascaris travassosi (Rodrigues & Rodrigues, 1971) Chabaud, 1978 from *Bufo marinus icterus* of the state of Rio de Janeiro, Brazil, is probably synonymous with *O. oxyascaris*. The character supposedly distinguishing these species (gubernaculum present in *O. travassosi*, absent in *O. oxyascaris*) cannot be used since a small, weakly sclerotized gubernaculum identical to that described for *O. travassosi* is present in *O. oxyascaris*.

FREITAS (1958) proposed the genus *Pteroxyascaris* with *Oxyascaris similis* Travassos, 1920 as type species. He distinguished this genus from *Oxyascaris* based on the presence of conspicuous lateral alae (supposedly absent in *Oxyascaris*), and differences in the number of male caudal papillae. However, we have shown herein that markedly slender lateral alae are present in males of *O. oxyascaris* and therefore this character cannot distinguish these genera. As illustrated in the species description below, differences in numbers of male caudal papillae are relatively minor and of no taxonomic value beyond separation of species. *Pteroxyascaris* Freitas, 1958 is therefore synonymized with *Oxyascaris* Travassos, 1920.

***Oxyascaris caudacutus* (Freitas, 1958) n. comb.**

Synonym: *Pteroxyascaris caudacutus* Freitas, 1958.

Material examined: from *Hyla fuscovaria*, MHNG 979.630 (1 σ , 2 f), 979.631 (4 σ , 7 f), 979.632 (2 σ , 8 f), 979.633 (1 σ , 6 f); *Hyla x-signata nasica*, 979.634 (1 f).

New Host Records; *Hyla fuscovaria*, *H. x-signata nasica*.

Localities and dates: estancia La Cordillera, Ypé Jhu, Canendiyu prov., 28.X.79 (979.630); Salto del Guaira, Canendiyu prov., 31.X.79 (979.631-632, 979.634); Ao Itabo Guazu, Alto Parana prov., 5.XI.79 (979.633).

D e s c r i p t i o n (Fig. 2): Oral opening triangular, three small lips present. Cephalic extremity with four large outer papillae and six minute inner labial papillae. Anterior extremity of oesophagus in form of three large projections covered with thick ring of cuticle and bearing on inner edge three small onchia. Lateral alae present, extending from just anterior to nerve ring in both sexes to the preanal caudal region in males and to near mid-

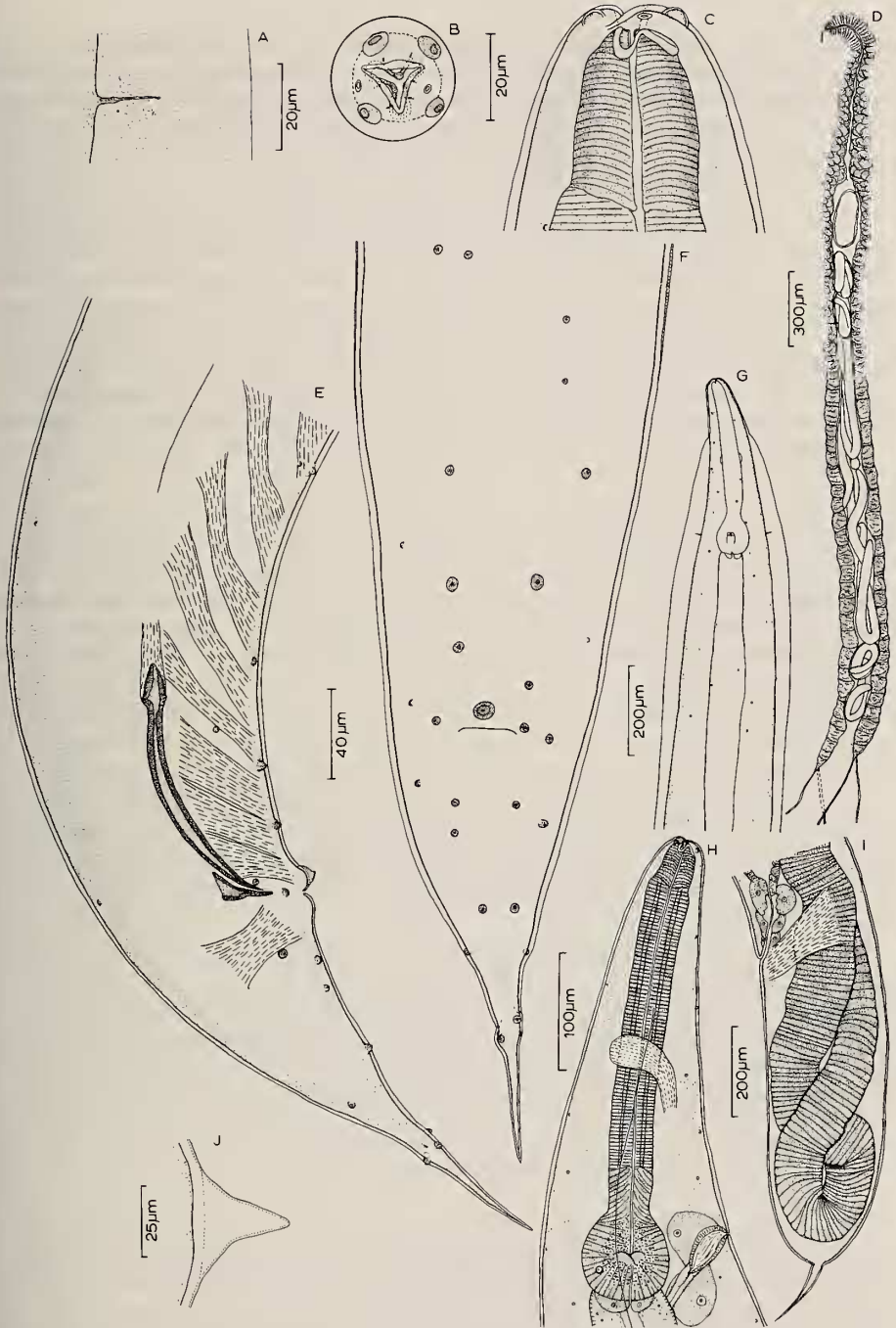


FIG. 2.

Oxyascaris caudacutus (Freitas, 1958) n. comb. A, anterior deirid and lateral ala at level of anterior end of intestine, ventral view. B, C, cephalic extremity, apical and lateral view. D, vagina, lateral view. E, F, caudal end of male, lateral and ventral view. G, anterior portion of male showing lateral alae, ventral view. H, anterior end of male, lateral view. I, tail of female, lateral view. J, cross section through lateral ala at level of anterior end of intestine.

body in females, markedly wide (35 μm) and thick at anterior end and tapering rapidly posteriorly. Cephalic vesicle lacking. Pair of minute anterior deirids present within lateral alae at level of excretory pore. Oesophagus divided into short anterior pharyngeal portion of corpus, long posterior portion of corpus, slender isthmus, and posterior bulb which is wider than the corpus and with three well sclerotized valves. Somatic papillae present, in two subventral and two subdorsal rows.

Male (8 specimens): Total length 3,50-3,70 mm. Length of oesophagus 392-403 μm . Nerve ring 142-188 μm and excretory pore 350-376 μm from anterior extremity. Tail 229-244 μm long, conical. Caudal papillae small, not easily distinguished from somatic papillae. Tail with four pairs of subventral, and two pairs of subdorsal papillae. Adanal region with one unpaired papilla on anterior lip of cloaca, and three pairs of subventral papillae which are somewhat variable in position. Preanal subventral surface with two anteriorly directed rows of from 3-4 papillae which are largest near the cloaca and diminishing in size anteriorly until they become indistinguishable from the somatic papillae. Subventral preanal region with 9-11 pairs of conspicuous muscles. Spicules 148-155 μm long, sharply pointed distally. Gubernaculum 36-40 μm long, weakly sclerotized.

Female (23 specimens): Total length 5,24-18,78 mm. Length of oesophagus 535-779 μm . Nerve ring 305-388 μm , excretory pore 341-584 μm and vulva 2,31-5,90 μm from anterior extremity. Tail 442-1150 μm long, robust, tapering abruptly to distal spike, containing coiled portion of posterior ovary in mature worms. Vagina muscular and laterally directed proximally, flexed to posterior throughout most of length, giving rise to two posteriorly directed uteri. One uterus flexed to posterior and with ovary located near vulva; other uterus directed anteriorly and with ovary located at posterior end of worm. Uteri in mature females containing many eggs. Eggs 90-104 μm long and 54-58 μm wide (based on five specimens), thin-walled, often containing fully developed larvae. Free larvae observed frequently *in utero*.

Discussion: *O. caudacutus* was originally described from *Hyla nasica* (identification of host not definitive according to FREITAS 1958) of Estado de Sao Paulo, Brazil. It has subsequently been recorded from *Leptodactylus sibilatrix* and *L. mystaceus* of Rio de Janeiro (FABIO 1982). The present report from Paraguay extends considerably the known range of this species.

O. caudacutus is easily distinguished from *O. oxyascaris* by its much more prominent lateral alae, relatively wider oesophageal bulb (exceeding in width the corpus), distribution of male caudal papillae, more anteriorly placed vulva, more elongate vagina, shape of male and female tails. From *O. similis* Travassos, 1920 (see redescription in FREITAS 1958) it may be distinguished by its more prominent oesophageal bulb, a male tail which is more finely attenuated distally, and a female tail which has a much more prominent distal spike.

II. SYSTEMATIC STATUS OF OXYASCARIDINAE

The Subfamily Oxyascaridinae Freitas, 1958, has been classified under three superfamilies. TRAVASSOS (1920) originally proposed the Family Oxyascarididae within the Superfamily Subuluroidea (see also FREITAS 1958); SKRJABIN *et al.* (1964) proposed Oxyascarididae as the type family of a new superfamily, the Oxyascaroidea; and CHABAUD (1978) placed the group as a subfamily of Kathlaniidae (Cosmocercoidea). Difficulty in classifying the group has resulted from the poor published descriptions of the cephalic structures and errors in interpreting the oesophageal morphology.

We accept the classification of the Oxyascaridinae within the Cosmoceroidea as proposed by CHABAUD (1978), but new morphological observations suggest that this small group has close affinities to the Family Cosmocercidae, rather than the Kathlaniidae. The cephalic structures of the two species of *Oxyascaris* redescribed herein are identical to that observed in such genera of the Subfamily Cosmocercinae as *Aplectana* Railliet & Henry, 1916, and *Cosmocerca* Diesing, 1861. This is not likely due to convergence. In contrast the cephalic structures of most kathlaniids include complex cheilostomal rings and struts not observed in Cosmocercidae or Oxyascaridinae.

All previous descriptions of Oxyascarines have described the oesophagus as having a reduced distal bulb apparently lacking valves. This incorrect observation has been the basis of much confusion. Oesophageal valves were small but clearly visible in the two species examined herein. Although the oesophageal bulb is relatively small in *O. oxyascaris* and *O. similis* (see FREITAS 1958), in *O. caudacutus* it is proportionally as large as in most species of Cosmocercinae. Finally the slender oesophageal isthmus of all species of *Oxyascaris* is identical to that observed in the Cosmocercinae, whereas in most genera of Kathlaniinae the isthmus tends to be swollen.

The evidence clearly suggests that the Oxyascaridinae should be transferred to the Cosmocercidae. *Oxyascaris* most closely resembles *Aplectana* (Cosmocercinae) (see BAKER 1980) and in fact these two genera may be distinguished only by the following. (1) Fully mature female *Oxyascaris* spp. are greater than twice the size of males, whereas in *Aplectana* there is little sexual dimorphism in size. (2) Fully mature female *Oxyascaris* spp. are from 15-30 mm long, whereas mature *Aplectana* spp. females do not exceed 5-10 mm. (3) Whereas in *Aplectana* spp. one uterus extends well anterior to and the other well posterior to the vulva and both ovaries always terminate anterior to the vulva, in *Oxyascaris* spp. the disposition of the uteri and ovaries is quite different as follows: in *O. oxyascaris* and *O. similis* (see FREITAS 1958) one uterus lies entirely posterior to the vulva and the other extends in part slightly anterior to the vulva, and one ovary is well anterior to the vulva and the other terminates near the vulva; in *O. caudacutus* both uteri lie posterior to the vulva, and one ovary is near the vulva and the other near the posterior end of the body.

These differences between *Aplectana* and *Oxyascaris* merit recognition at the level of genus, but not at a higher taxonomic category. Therefore we propose that the Subfamily Oxyascaridinae Freitas, 1958, falls as a synonym of the Subfamily Cosmocercinae Railliet, 1916. Within this context, the definition of *Oxyascaris* is emended as follows:

Oxyascaris Travassos, 1920: Cosmocercinae sensu Chabaud, 1978, Cosmocercidae, Cosmoceroidea. Cephalic lips not bilobbed, mouth triangular. Tail of male lacking plectanes or rosettes. Marked sexual dimorphism in size (mature females more than twice as large as males). Mature females markedly large in size (> 15 mm long). Numerous small eggs or free larvae in uteri. Both uteri divergent and either both located posterior to vulva, or one uterus extending slightly anterior to vulva. Ovaries variable in position, but never both terminating well anterior to vulva. Parasitic in Neotropical anurans and snakes.

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